ENTRY NO. 102

NAME OF MACHINE: Medi-Physics MC-40 Cyclotron 2
INSTITUTION: Medi-Physics Inc.
ADDRESS: 3350 N. Ridge Ave., Arlington Heights, Il. 60004 U.S.A.
TEL (312) 398-8400 TELEX 230-25-4439
IN CHARGE R. Hubbard REPORTED BY E. A. Kowalski

HISTORY AND STATUS Scanditronix MC40

DESIGN, date: Model tests
ENG DESIGN, date:
CONSTRUCTION, date:
FIRST BEAM, date (or goal): April 1982
MAJOR ALTERATIONS:
COST, ACCELERATOR:
COST, FACILITY, total:
FUNDED BY:

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS: ENGINEERS 4
TECHNICIANS 11 CRAFTS 2
GRAD STUDENTS involved during year:
OPERATED BY: Research staff or Operators
OPERATION 140 hr/wk. On target 120 hr/wk
TIME DISTR. in house 100 %, outside %
BUDGET, op & dev:
FUNDED BY:

RESEARCH STAFF, not included above

USERS, in house: outside:
GRAD STUDENTS involved during year:
RESEARCH BUDGET, in house:
FUNDED BY:

MAGNET

POLE FACE, diameter (compact) 130 cm, R-extraction 50 cm
R injection cm
GAP, min 10 cm, Field 21.3 kG
max 18 cm, Field 13.2 kG at 241,000 Ampere turns
AVERAGE FIELD at R ext 17.9 kG
B max/<B> 1.19
NUMBER OF SECTORS compact 3, separated; Spiral, max 45 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 8 Concentric Gradient Coils
4 set of Harmonic Coils
CONDUCTOR, material and type Cu. Sq. Tube
STORED ENERGY (cryogenic) MJ
POWER: main coils 130 max kW: current stability 10^{-5}
trimming coils 10 max kW: current stability 10^{-4}
WEIGHT: Fe 57 tons: coils 2.8 tons
COOLING system P. I. Water
ION ENERGY (Bending limit) E/A = 40 q^2/A^2 MeV/amu
(Focusing limit) E/A = q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 2 angle 90 deg
BEAM APERTURE 2 cm; DC Bias 0 kV
TUNED by, coarse Mov. Short fine Variable Cap.
RF 12 to 27 MHz, stable ± 10^{-5}
Orb F 6 to 26.8 MHz
HARMONICS, RF/Orb F, used 1 & 2
DEE–Gnd, max 44 kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt) $<10^{-3}$
ENERGY GAIN, max 176 kV/turn
RF PHASE, stable to ± 0.5 deg
RF POWER input, max. 60 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width 15-20 Deg.

VACUUM SYSTEM

OPERATING PRESSURE 9×10^{-6} Torr or mbar
PUMPS, No, Type, Size 2 oil Diffusion Ø 400 with Refrigerated Baffles

ION SOURCES

Internal Cold Cathode, Axially mounted

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic Deflector, Magn. Focus Chamber

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2, movable m^2
TARGET STATIONS in rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
P		38	200	65
P		20	200	65
D		18.3		65
D		9.7		65
SECONDARY			(part/s)	

BEAM PROPERTIES

	MEASURED	CONDITIONS
PULSE WIDTH	13 RF deg	pμA of MeV ions
PHASE EXC. max	RF deg	pμA of MeV ions
EXTRACT eff.	85 %	65μA pμA of 38 MeV P ions
RESOL ΔE/E	%	pμA of MeV ions
EMITTANCE		
(π mm-mrad)	axial	pμA of MeV
	rad	

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

1)
2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

Conventional Analog Control.
Micro Prosser Based interlock System.